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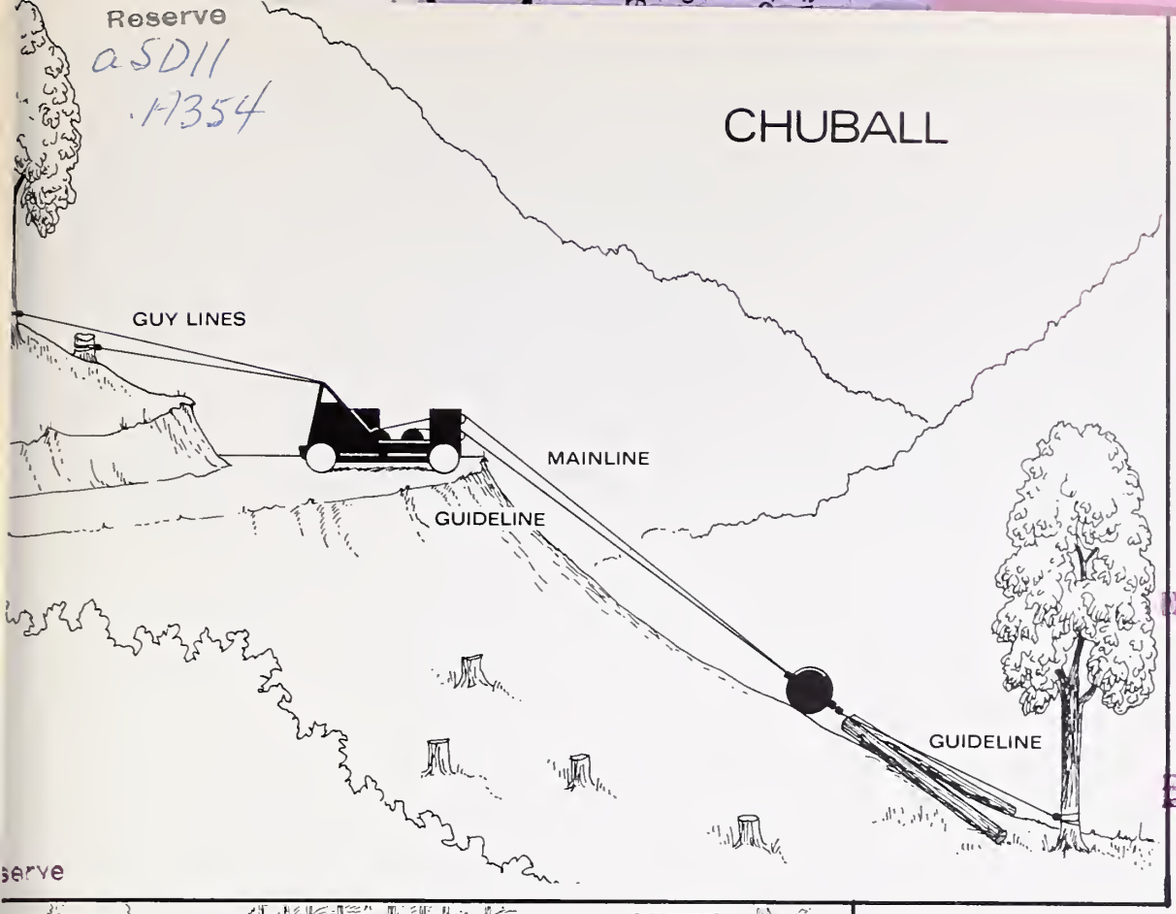

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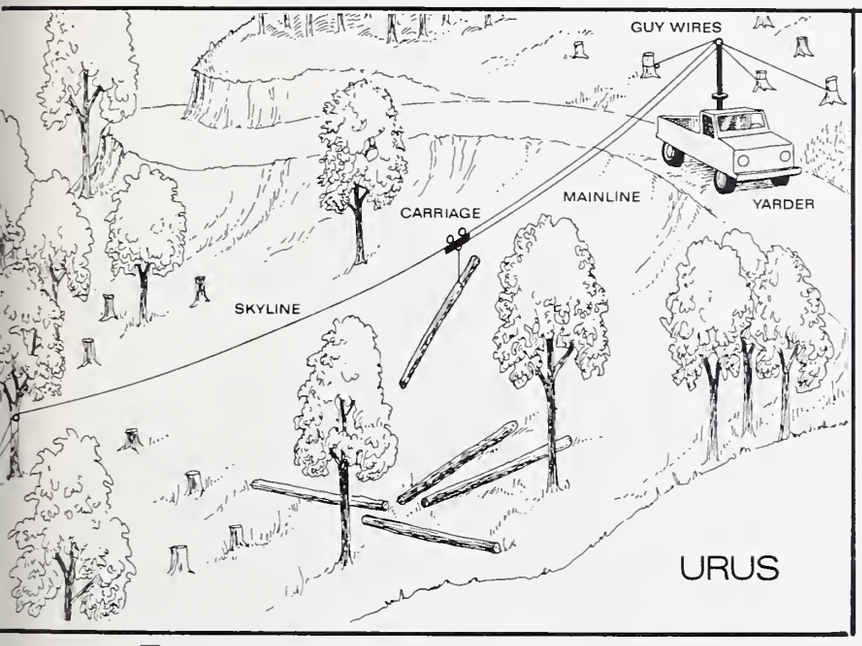

FORESTRY SCIENCE PHOTO STORY

Photo Story No. 28

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CABLE LOGGING IN APPALACHIA?

forestry researchers look at two systems

*T*here's still a lot of timber worth harvesting in Appalachia. But so much of it is out of reach on steep slopes, or out of reach simply because of harvesting restrictions imposed for environmental reasons. We need wood despite these hindrances. So how do we get it?

Forest Service research engineers stationed at the Forestry Sciences Laboratory in Morgantown, W. Va., are analyzing the timber harvest problems of Appalachia, as well as potential solutions. They feel that new harvest systems and appropriate equipment are what's needed to help Appalachia stage a come-back as an important timber producer.

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NORTHEASTERN FOREST EXPERIMENT STATION • UPPER DARBY, PENNSYLVANIA 19082

NATIONAL FOREST SYSTEM COOPERATIVE FORESTRY FORESTRY RESEARCH

Researcher's Idea

To begin with, the engineers, led by Harry Gibson, are examining the brain child of fellow Forest Service researcher Thomas Church of Princeton, W. Va. Church was responsible for the design of Chuball, a novel approach to logging by cable.

Besides being able to reach timber on otherwise inaccessible slopes where conventional wheeled logging skidders cannot negotiate, the Chuball system is less damaging to the ground around a harvest site. Chuball requires fewer logging roads, since it can descend some 500 feet down a slope -- twice as far as traditional logging apparatus. Besides saving the cost and environmental disturbances involved in building such roads, Chuball also saves on damage to remaining trees, since it is both narrower and lighter than most logging devices.

As its name implies, the Chuball system involves a ball. This durable, shock-withstanding ball is 5 feet in diameter and made of steel. Although hollow, it weighs 3,000 pounds. Attached to a 5/8-inch steel cable, it runs up and down the hillside like a yo-yo.

Logging With Chuball

Operating the Chuball system begins by driving a vehicle -- called a yarder -- along a logging road to a spot at the top of a slope, where it is anchored by guy lines. The vehicle operator first releases two cables attached to winches on the yarder, so they can be strung through pulleys mounted on a nearby tree. Once this is done, one cable -- called the guideline -- which passes through the steel ball, is carried downhill and anchored to a sturdy tree below. In addition to marking the path of the ball, this guideline offers an important safety feature. Should the ball break loose from its other cable -- called the mainline -- which controls the ball, it will still be attached to the guideline and will merely head along the set path and stop at the anchoring tree, rather than run away.

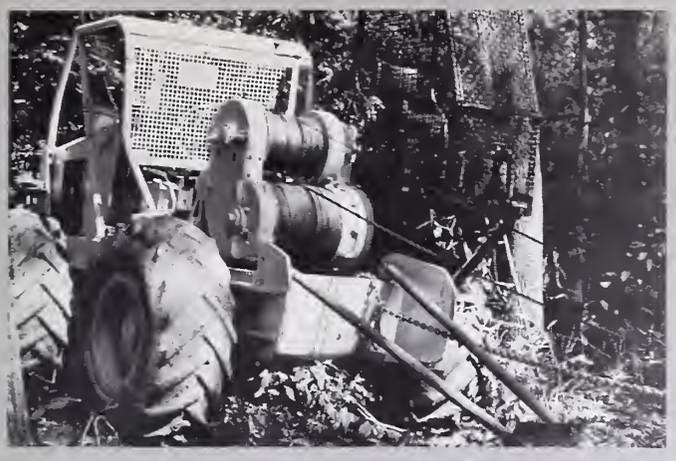
Once the guideline is anchored, the operator releases the mainline and allows the ball to proceed to its destination downhill. Although the ball may graze trees en route it will do very little damage to them and the chances of its entangling are unlikely. On arrival, a clamp is attached to the guideline to lock the ball in place.

At this point, a worker pulls the mainline through the ball to a nearby cut log. He attaches the log to the mainline by means of a choker. The log is then reeled back to the ball, so the mainline can pull both ball and log up the hill to an awaiting logging truck.

This operation does not reduce the number of men who must be present on a logging crew. But it is advantageous to the crew in that the ball can scale the slope alone and bring the cable down, without need of a man to make each difficult trip down and back.

Engineers Test the System

Having built the Chuball equipment, the Morgantown engineers are now testing it and refining the system for its use in studies at the Fernow Experimental Forest in Parsons, W. Va. On the Experimental Forest, which approximates forest conditions throughout Appalachia, Forest Service Timber and Watershed Research Laboratory and National Forest System personnel are cooperating in test efforts.



Two sets of cables - mainline and guideline - are shown on winch drums of the yarder vehicle.

Chuball at bottom of set. The guideline has been anchored to the downhill tree at left.

These devices make up the Chuball system, under test by the U. S. Forest Service as a cable method of harvesting hard-to-reach timber.

A choke setter attaches the chain choker and grab to the Chuball's mainline.

The log, pulled to Chuball from the side, is ready for a yo-yo like ride uphill.

In this work, the researchers are further assessing whether Chuball is technically and economically feasible. An important aspect of this assessment involves time tests to determine whether the system can retrieve wood fast enough to be profitable for use by small private loggers.

Forest Service engineers are investigating uses for Chuball in other areas where traditional logging equipment cannot be used. Swampy lands offer one possibility. Many trees grow to maturity in the soft ground of swamps, but cannot be reached for

harvest because the ground will not bear the weight of a skidder. Chuball, which is expected to sink into soft soil less, could be indispensible here.

In the swamp operation, Chuball works on the same principle as on a slope, except that four guidelines, rather than one, are set out to form a square over the swamp. Pulleys are mounted on trees at three corners of the square, while the yarder maintains tension at the fourth corner. The Chuball is fed out from the yarder along one side of the square by means of a rehaul line.

URUS in operation: a moving carriage and its log passanger begin their return trip up an Appalachian hillside.

Skyline Cable

Besides investigating the possibilities of Chuball, Morgantown researchers are also involved in a test program of other cable systems that might be useful in Appalachian woodlands. One such cable skyline system, called URUS, was developed in Austria, and is being used in Europe, where timber size and rugged terrain are comparable to Appalachia. Some URUS systems are also presently operating to thin timber in the western United States. Most systems in use in the West, however, are much more elaborate and more costly than might be practical in Appalachia, where timber lands have few trees of high value and logging companies are smaller.

URUS is known as a "Gravity Skyline System." It differs from Chuball mainly in having its cable some distance from the ground.

URUS works like this: a truck, or yarder, mounted with an engine is anchored by guy wires at the top of a hill. There are two main winches on this yarder vehicle. One winch controls an overhead cable, which leads from the vehicle to a high point on some distant, standing tree -- dubbed the tail spar -- where it is anchored. A moving carriage, which bears the log-hauling cable, shuttles along this cable. The yarder's second winch controls the carriage's chain hook. The carriage has a locking mechanism, so that it will not go beyond a desired point on the overhead cable. When the carriage reaches its destination, its cable hook is released on signal. This cable is pulled to the log and is attached manually, then pulled in and up to the carriage by the yarder engine. Finally, both carriage and attached log are returned via the aerial cable to the top of the hill, where the log is dropped.

The major advantage of the URUS system lies in the fact that its overhead cable can reach some 1,000 feet downslope, necessitating only one-fourth as many logging roads on a forest.

A Better Way

Helping to find better ways to get mature timber out of the woods and into use is an important function of the USDA Forest Service research program. Thanks to research engineers at Morgantown, more Appalachian wood may soon be on its way to market -- without sacrificing efficiency or a quality forest environment.